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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/647,985	08/26/2003	Patricia Beauregard Smith	TI-33260	3087

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EXAMINER	
EL ARINI, ZEINAB	

ART UNIT	PAPER NUMBER
1746	

DATE MAILED: 06/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/647,985	SMITH ET AL.	
	Examiner	Art Unit	
	Zeinab E. EL-Arini	1746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-20 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-20 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 2-4, 6-14, 16-18, and 20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claims 2-3, 7-8, 13, and 16-18, line 1, "of claim 1, the" is indefinite term.

In claim 4, line 1, "of claim 3, the" is indefinite term.

In claim 6, line 1, "of claim 5, the" is indefinite term.

In claims 10-12, line 1, "of claim 9, the" is indefinite term.

In claim 14, line 1, "of claim 13, the" is indefinite term.

It is suggested that in claims 2-4, 6-8, 10-12, and 14, line 1, before "the", ---"wherein"--should be inserted.

In claim 8, line 1, "the low- pressure anneal" lacks antecedent basis.

In claim 11, line 2, "at most" is indefinite term.

In claim 20, line 9, "whereby" is indefinite term.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*,

11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-3, 5-6, 9, 12, 15, and 20 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 7, 30-31, 51, and 52 of copending Application No. 09/975,639. Although the conflicting claims are not identical, they are not patentably distinct

from each other because the process in both applications are functionally equivalent.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States

only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 9-13, and 15 are rejected under 35 U.S.C. 102(e) as being anticipated by Yau et al. (US 2003/0194877 A1).

Yau et al. disclose a method for processing workpiece comprising etching metal from workpieces, wet cleaning and annealing the workpiece. See the abstract, and the claims. Removing polymer residue is inherent in the Yau et al. process. The reference discloses the high temperature anneal and the temperature of performing the anneal as claimed. See paragraphs 21, 23, and 27.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-3, 5-8, and16-18 are, rejected under 35 U.S.C. 102(b) as being anticipated by Smith et al. (US 2002/0058397 A1).

3. Smith et al. disclose a method of cleaning a wafer comprising cleaning a polymer residue from etched wafer using a wet clean solvent; and performing the annealing step as claimed.

4. The reference discloses the etched wafer, the acid, the dry clean, the plasma, the low pressure anneal, the cleaning performed after the via-etch process, the copper and barrier deposition as claimed. See the abstract, Fig. 1, paragraphs 17-27, and the claims.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 2, 5-6, 14, 16-18, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yau et al. in combination with Smith et al. (6,713,402).

Yau et al. as discusses supra do not teach a dry clean of etched wafer to remove photoresist, prior to cleaning the polymer residue, the plasma including at least hydrogen, oxygen, and inert gas, the copper deposition, the metal deposition, and the solvent as claimed.

Smith et al. disclose a method for polymer removal following etch-stop layer etch. The cleaning method comprises removing the sidewall polymers from interconnect vias or trenches, wherein a wafer is exposed to a plasma comprising hydrogen and an inert gas in a plasma cleaning chamber following etch-stop etching. See the abstract.

It would have been obvious for one skilled in the art to use the plasma cleaning of Smith et al. in the Yau et al. process to improve cleaning techniques by which etch-stop etch polymer residue can be cleaned or removed from interconnect structure cavities without adversely impacting device dimensions or performance. See col. 2, lines 27-39, col. 18, lines 8-12. The limitation of claim 2,

see col. 1, line 60- col. 2, line 7. The reference discloses the metal deposition including a copper deposition, and the barrier deposition as claimed. See col. 7, lines 8-14, and col. 11, lines 7-26.

It would have been obvious for one skilled in the art at the time applicants invented the claimed process to use the copper deposition and the barrier deposition taught by Smith et al. in the Yau et al. process to obtain the claimed process. This is because both references are from the same technical endeavor which is removing residues from the wafer surface following etching process, to prepare the wafer or workpiece to metal deposition. One skilled in the art would adjust the time of annealing of Yau et al. to obtain optimum results.

Claims 3-4, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yau et al. in combination with Smith et al. as applied to claims 2, 5-6, 14, 16-18 and 20 above, and further in view of Kim et al. (US 2004/0060579 A1).

Yau et al. in combination with Smith et al. as discussed supra disclose all limitation with the exception of wet clean process using solvent comprising acid as claimed.

Kim et al. disclose a method of cleaning ceramic parts after etching by using a solution comprises organic solvent. The organic solvent comprises dimethyl acetamid (DMAC). See paragraphs 43, 75-76,

It would have been obvious for one skilled in the art at the time apl invented the claimed process to use the acid taught by Kim et al. in the Yau et al. in combination with Smith et al. process to improve swelling effect, and therefore improving the cleaning process.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zeinab E. EL-Arini whose telephone number is (571) 272-1301. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Barr can be reached on (571) 272-1414. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Zeinab Elarini

Zeinab E. EL-Arini
Primary Examiner
Art Unit 1746

ZEE

06/10/05